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Land use change and driving factors in a fragile coastal rainfed lowland rice - sugar palm system of southern Thailand

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For centuries, rainfed lowland rice production associated to sugar palm (*Borassus flabellifer*) hedges planted in the paddy field bunds (RLR-SP) has been an emblematic cultural agroforestry system in the indianized Southeast Asian countries. But recent changes in communication infrastructure, commercialization, urbanization, private and state interventions are driving the rapid transformations of these multi-functional systems. In the absence of in-depth analyses documenting the socio-ecological impacts of such change on household livelihoods and landscapes, a case study on the transformations, over the past four decades, of one of the most sophisticated coastal RLR-SP agroforestry system was implemented in Sathing Phra peninsula, Southeastern Thailand. Chronological series of satellite images and ground truthing were used to characterize and quantify land use change during 1983-2015, and 120 interviews with concerned stakeholders were carried out to understand agro-ecological, social, and economic effects of the driving factors of change on their livelihood systems. We show a process of diversification of farming (and off-farm) activities along their gradual market integration, since the opening of bridges and all-weather roads linking the area to neighboring cities in the 80s. We found that the traditional RLR-SP agroforestry system survived, almost unscathed, a first series of agrarian change. It was characterized by attempts at introducing irrigated rice, shrimp farming small perennial tree plantations in the paddies, or converting deep-water rice areas into small-scale integrated farming systems. The much improved communication infrastructures, and lack of irrigation water to switch from the low and unstable RLR yields to higher-value cash crops, increased the mobility of family farm laborers. They sized wage-earning opportunities, in the village or in fast developing urban centers, and escaped the drudgery of tapping sugar palms, in increased numbers. But a rising and profitable demand for sugar palm fruits from caning factories allowed the maintenance of the multiple functions of dense and healthy palm groves. A more recent “palm narang” government policy, supported by the establishment of new palm oil companies in the area, promoted small oil palm plantations in abandoned paddy fields to raise farm incomes. As the conversion to oil palm plots was the most important land use change observed during the last decade, it seems to be a more serious threat to the survival of the RLR-SP agroforestry system. In addition to these impacts of peri-urbanization combined with private and state interventions, an increase in the frequency of extreme rainy and windy events was also uncovered. This is underlining the need for the collaborative design of land-use scenarios and related collective and coordinated action plans to adapt this, diverse but increasingly vulnerable, iconic agroecosystem to future challenging socio-ecological circumstances.

Keywords: rice, Borassus flabellifer, crop diversification, market access, climate change.